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ABSTRACT

This module on ignition systems is the second of six (CE 028 296-301) in the auto mechanics course of a bilingual skills training program. (A Vocabulary Development Workbook is available as CE 028 294.) The course is designed to furnish theoretical and laboratory experience. Module objectives are for students to develop trade-related Spanish/English vocabulary, to name functions and circuits of an ignition system, to explain how voltage is increased by the coil and the spark is delivered by the distributor, and to name common problems caused by a faulty ignition system. Contents include list of module objectives; pretest; five sections on (1) ignition systems, (2) primary and secondary circuits, (3) how voltage is increased, (4) delivery of the spark to the proper cylinder, and (5) problems of the primary and secondary circuits; posttests; and English/Spanish vocabulary list. Each section is organized into this format: instructions in Spanish and English; vocabulary; and concepts (statements or questions to direct reading); readings; and worksheets to evaluate comprehension of the trade-related reading material. Worksheets also cover these areas: vocabulary, definitions, word attack skills, spelling, writing skills, and application of terminology to the trade area. (YLB)

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I. PURPOSE

This module is to:

1. Assist students in developing trade-related vocabulary.

2. Facilitate the learning of the trade through reading information sheets, vocabulary lists and language exercises.

3. Provide student with individual check lists for individual progress.

II. INTRODUCTION

Auto Mechanics requires the student to follow a defined theoretical course of study as well as acquire practical knowledge in the respective trade. Due to the limited amount of time allowed for theory and the difficulty of the technical vocabulary found in the reading, the student often needs additional help in this area. Students in the Auto Mechanics trade are required to pass periodical tests and a final review before receiving a certificate allowing them to practice their trade. To succeed in passing this exam and to be better equipped for the job, the student must be able to function in the oral and written communication skills and utilize the technical vocabulary of their trade. This module is structured to provide for individual needs of the students so that they may progress at their pace in the academic or theoretical area. A simple coding system is utilized to facilitate student use.

III. ACTIVITIES

Because each module is geared for individualized instruction it is important to assess the individual needs of the students. A pre-test is administered to students before they begin working with a module. Instructions are given orally in Spanish and English.

Instructions, vocabulary and concepts in each module are written in Spanish and English so as to explain the purpose of each reading. There is a reading for each objective presented in the module. The reading is referred to as an information sheet. This sheet is designed to provide the student with reading material incorporating the technical vocabulary that is needed in the trade skill area. The gradation of reading is from simple to more complex. Thus the information sheet facilitates the learning process in the theoretical course of study. Each information sheet is followed by a series of diversified work sheets directly checking for comprehension of the reading material. Other items covered in these work sheets are: vocabulary, definitions, work attack skills, writing skills, spelling and application of terminology to the trade area.

Oral language development exercises directed by the instructor constantly reinforce the concepts presented. Students have an opportunity to utilize and develop the technical vocabulary needed in their trade by interaction among themselves, the instructor and tutors. The Bilingual dimension is specifically directed at concept and vocabulary development.

The students are directed to utilize supplementary materials available through the Learning Resource Center to reinforce each area as they progress in the module. Audio visuals are utilized to introduce subject matter. They are also accessible to the students to be used on an individual basis.

IV. EVALUATION

The students are evaluated by the instructors as to their progress in language and in the course content area through the pre-test, work sheets, check list and a post test. Individual student profiles and folders are kept on record to check on student progress at all times. Oral development skills are assessed individually.

Students go through the following process in utilizing the modules:

Pre-test (Students scoring 85% or below must complete the entire module. Those scoring above 85% may go on to the next module.)

Reading of instruction sheet
Information Sheet
Series of written and oral exercises
Oral evaluation
Post test (oral and written)
Recycling, if needed (Students scoring 85% or below on post-test are recycled through module in designated weak areas. See coding system.)

V. MODULE OUTLINE

2.0 Automotive Ignition System

2.1 The Ignition System

2.2 The Primary and Secondary Circuits

2.3 How Voltage is Increased

2.4 Delivery of the Spark to the Proper Cylinder

2.5 Problems of the Primary and Secondary Circuits

STUDENT OBJECTIVES

Upon completion of this module the student will be able to:

2.1 Name and give examples of two of the three main functions of an ignition system.

2.1.1 Recognize and define 75% of the vocabulary.

2.1.2 Name and define five of the six main parts of an ignition system.

2.2 Name the two circuits of an ignition system.

2.2.1 Recognize and define 75% of the vocabulary.

2.2.2 Name three of the four parts that the ignition system is composed of.

2.2.3 Trace, on a diagram, the path of the secondary circuit through its entire course.

2.3 Explain how the voltage is increased by the coil.

2.3.1 Recognize and define 75% of the vocabulary.

2.3.2 Trace and explain how the current is increased in the primary circuit.

2.3.3 Trace and explain how the current is increased in the secondary circuit.

2.4 Explain how the spark is delivered by the distributor.

2.4.1 Recognize and define 75% of the vocabulary.

2.4.2 Explain the function of the rotor.

2.4.3 Trace the high voltage current from the coil to the spark plug.

2.5 Name four of the seven most common problems caused by a faulty ignition system.

2.5.1 Recognize and define 75% of the vocabulary.

2.5.2 Name the two instruments used in troubleshooting the ignition.

2.5.3 Explain eight of the thirteen steps of troubleshooting.

PRETEST FOR IGNITION SYSTEM

1. What are the six main parts of an ignition system?

2. What are the three main functions of an ignition system?

3. What is the purpose of the ignition distributor?

4. What is the primary circuit composed of?

5. How does the ignition system increase the voltage?

6. What does the secondary winding do?

7. How is the cam assembly operated?

8. How does the rotor deliver the high voltage current?

9. What is the first step in troubleshooting an ignition system?

1o. What are the two colors of the spark and what does each mean?

Instructions: 2.1

In this information sheet you will read about the ignition system. The information will explain the purpose of the ignition system and its parts. There is a vocabulary list that will help you remember words that are part of an ignition system.

Instrucciones:

En esta página de información vas a leer del sistema de ignición. La información le explicará la intención y las partes de este sistema. También contiene una lista de vocabulario que le ayudará con palabras que son parte del sistema de ignición.

Vocabulary

Ignite, ignition - To start or spark.
System - group of units working together.
Battery - A unit which is made up of energy cells connected together to produce an electric current.
Ignition switch - is a device that opens and closes an electric circuit.
Ignition coil - produces the high voltage needed to spark the engine.
Ignition distributor - distributes the voltage produced by the ignition coil to the proper spark plug.
Spark Plug - The assembly which includes a pair of electrodes and an insulator that has the purpose of producing a spark gap in the engine cylinder.
Wiring - carries the electric surges from the battery to the spark plugs.

Keep the following questions in mind while reading the article:

1. What does the ignition system ignite in the cylinders?

2. Why must the ignition system increase the voltage?

3. What does the ignition system provide to the spark plugs?

4. Why must the ignition systen time the power strokes?

5. What are the ignition system's (6) six main parts?

The Ignition System

1. As an automechanic you will work with the ignition system which is one of the most important systems in an engine. The word ignition comes from the word ignite which means to start or spark. The word system means a group of units working together to perform a specific function.

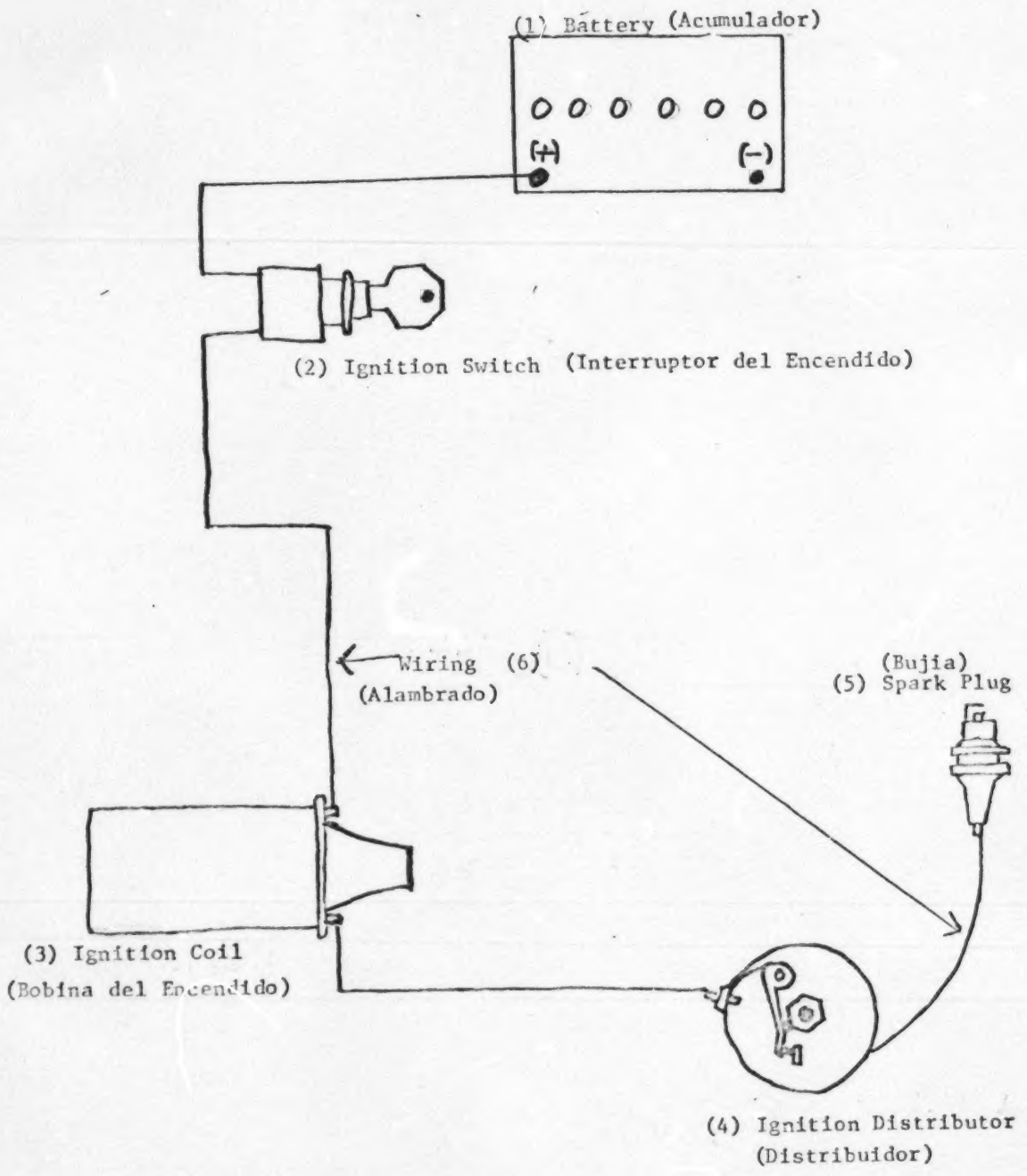
2. The ignition system must ignite the compressed air fuel mixture in the engine cylinders by performing three main functions. These functions are:

   1. To increase the low voltage of the battery (12 volts) to a higher voltage.
   2. To provide a spark to the spark plugs.
   3. To time the power strokes igniting the gases at the right instant.

3. The ignition system consists of six (6) main parts and other smaller parts that are equally impor ant. The six main parts are the:

   1. Battery-A unit which is made up of energy cells connected together to produce an electric current.
   2. Ignition switch-is a device that opens and closes an electric circuit.
   3. Ignition Coil-produces the high voltage needed to spark the engine.
   4. Ignition distributor-distributes the voltage produced by the ignition coil to the proper spark plug.
   5. Spark Plug-The assembly which includes a pair of electrodes and an insulator that has the purpose of producing a spark gap in the engine cylinder.
   6. Wiring-carries the electric surges from the battery to the spark plugs.

4. Now you should be aware of the three main functions of the ignition system and its six (6) main parts. For a simplified explanation of the ignition system see the following diagram. The next information sheet will explain the two (2) circuits of an ignition system.


(1) Battery (Acumulador)
(+)
(-)
(2) Ignition Switch (Interruptor del Encendido)
Wiring (6)
(Alambrado)
(Bujia)
(5) Spark Plug
(3) Ignition Coil
(Bobina del Encendido)
(4) Ignition Distributor
(Distribuidor)

Find The Answers 2.1

1. How many main parts exist in the ignition system?

   A. Five
   B. Four
   C. Six
   D. Seven

2. The word in paragraph 1 which means to spark is _____.

3. The words in paragraph 3 "carries the electric surges," refer to the word _____.

4. The story does not say so, but it makes you think that

   A. The ignition system is not important.
   B. The ignition system is mainly responsible for starting the engine.
   C. The ignition system is responsible for the power that runs the radio.

5. The purpose of the spark plugs are to

   A. Open and close an electric circuit.
   B. Produce high voltage.
   C. Produce a spark gap in the engine cylinders.

6. The ignition distributor is a device that opens and closes an electric circuit.

   Yes No Does not say

7. What is the function of the ignition switch?

   A. To increase the low voltage of the battery.
   B. To open and close an electric circuit.
   C. To time the power strokes.

Match the following:

_____Ignition Coil	A. Device that opens and closes an electric circuit.
_____Battery	B. A unit made up of energy cells connected together.
_____Wiring	C. Produces high voltage needed to spark the engine.
_____Ignition Distributor	D. Carries the electric surges from the battery to the spark plugs.
_____Spark Plug	E. Distributes voltage produced by the ignition coil to the proper spark plug.
_____Ignition Switch	F. Assembly which includes a pair of electrodes and an insulator.

Mark True (T) or False (F) next to the following statements.

_____System means a group of units.

_____There are two main functions in the ignition system.

_____A battery is used to produce an electric current.

_____The ignition system has five main parts.

Underline the correct word in each sentence. 2.1

1. There are six (main, mane) parts in the ignition system.

2. System means a group (off, of) units which work together.

3. The function of the spark plugs is (to, too) produce a spark gap in the engine cylinder.

4. The ignition system must ignite the compressed air fuel mixtures (by, bye) performing three main functions.

5. Gases must be ignited at the (right, rite) instant.

6. There are (two, too) circuits in an ignition system.

Answer the following questions:

1. What are the three main functions of the ignition system?

2. What is the purpose of the ignition coil?

3. What are the six main parts of the ignition system?

4. What device opens and closes an electric circuit?

Instructions:

In this information sheet you will read about the primary and secondary circuits. The vocabulary list will help you identify important words in the information sheet.

Instrucciones:

En esta página de información vas a leer del circuito primario y secundario. La lista de vocabulario te ayudará a identificar palabras importantes que encuentraras en esta página de información.

Vocabulary

Circuit - The path of an electric current.

Composed - Made up of.

Voltage - Measurement of an electrical current.

Primary - First in the order.

Secondary - Second in the order.

Keep the following questions in mind as you read the information.

1. What is a circuit?

2. What is primary and secondary?

3. What makes up the primary circuit?

4. What makes up the secondary circuit?

5. What does the primary circuit do?

6. What does the secondary circuit do?

The Primary and Secondary Circuits

1. As you know there are six (6) main parts to an ignition system. The ignition system also has two (2) circuits. The two circuits are called the primary circuit and the secondary circuit. A circuit is the path of an electric current. The primary circuit runs from the battery to the ignition switch to the primary winding in the ignition coil and on to the ignition distributor. The primary circuit is composed of:

    1. The contact points in the distributor.
    2. The primary winding in the coil.
    3. The ignition switch.
    4. The battery.

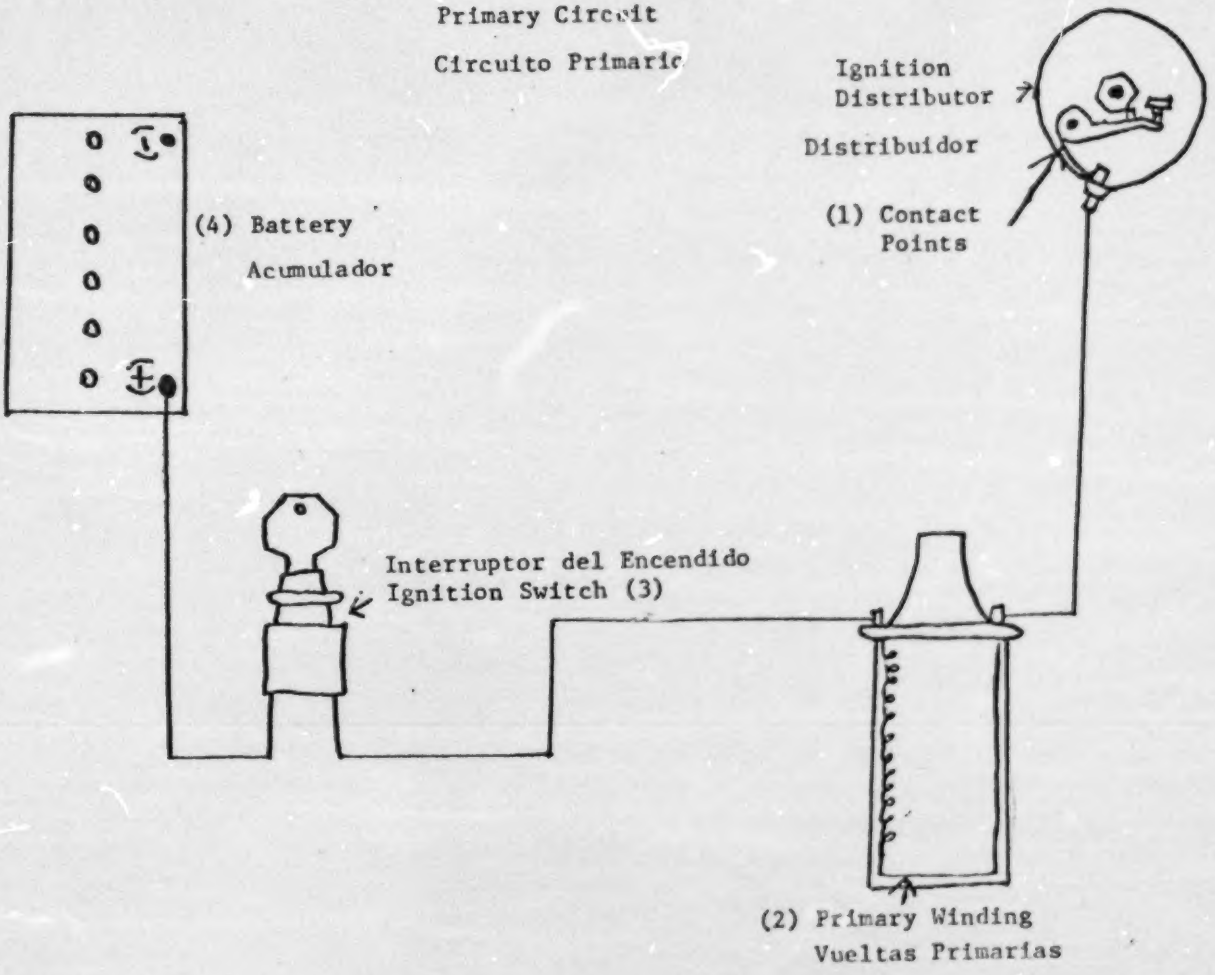
2. The secondary circuit is the circuit that produces the high-voltage sparks, and through the ignition distributor, distributes the high voltage sparks to the spark plugs. The secondary circuit is composed of:

    1. The secondary winding in the ignition coil.
    2. The distributor cap with the wires, or cables coming from the distributor cap and heading towards the spark plugs.

3. Now you should know the six (6) main parts of an ignition system and the two circuits. For a detailed explanation of the two circuits see the following diagram. The next information sheet will explain to you how the voltage is increased.

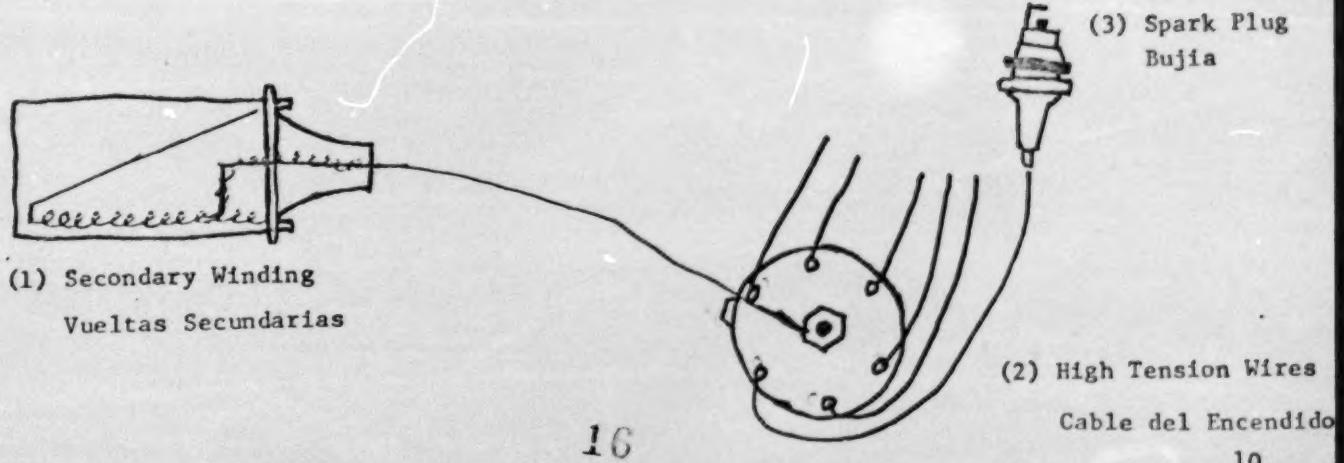
Primary Circuit

Circuito Primario



Secondary Circuit

Circuito Secundario



Find The Answers: 2.2

1. How many circuits are there in the ignition system?

   A. Three
   B. Six
   C. Four
   D. Two

2. The word in paragraph 1 which means the path of an electric current is

   _____.

3. The words in paragraph 1 "composed of" refer to _____.

4. The story does not say so, but it makes you think that

   A. The ignition system is very simple.
   B. The primary and secondary circuits are not important.
   C. The primary and secondary circuits are responsible for carrying the current from the battery to the spark plugs.

5. The purpose of the primary circuit is to carry the current from the

   A. Battery to the ignition distributor.
   B. Primary winding to the secondary winding.
   C. Spark plugs to the battery.

6. The secondary circuit is responsible for producing the high voltage sparks?

   Yes No Does not say

7. The purpose of the ignition distributor is to:

   A. Distribute the circuit to the coil.
   B. Distribute the high voltage to the spark plugs.
   C. Distribute the current to the primary circuit.

Fill in the blank spaces. 2.2

1. co_ta_t_o_nt_

2. s_it_h

3. b_t_er_

4. p_i_ar_

5. _o_l

6. d_st_ib_t_r

7. se_on_a_y

8. c_rc_it

9. _g_it_on

10. _olt_ge

Write the correct answer in the space provided.

1. The two circuits in the ignition system are_____ and _____.

2. A _____is the path of an electric _____.

3. The primary circuit runs from the _____and ends at the ignition _____.

4. The primary _____is in the ignition_____.

5. The _____circuit produces the high _____sparks.

6. The ignition _____distributes the high _____sparks to the _____.

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Fill in the blanks

The _____circuit is the circuit that produces the high-voltage _____, and through the ignition _____distributes the _____sparks to the spark plugs. The _____circuit is composed of:

1. The secondary _____in the ignition _____.
2. The _____cap with the wires, or _____ coming from the _____cap and heading towards the _____.

Answer the following questions:

1. What is the path of the primary circuit?

2. What is the primary circuit composed of?

3. What is the secondary circuit composed of?

4. What is the secondary circuit responsible for?

5. How does the secondary circuit distribute the high-voltage current?

Instructions:

In this information sheet you will learn how the voltage is increased by the ignition system. The vocabulary list will help you remember important words in this information sheet.

Instrucciones:
En esta página de información vas a leer como se aumentan los voltios por el sistema de ignición. El vocabulario te ayudará a recordar palabras importantes en esta página de información.

Vocabulary:

Increase - to make greater.

Decrease - to make less.

Transformer - to change.

Winding - having a course that winds.

Keep the following questions in mind as you read this information sheet.

1. What kind of transformer is the ignition coil?

2. What must be increased in order to ignite the compressed gases?

3. Why must the voltage increase from 12 volts to 250 volts to 20,000 volts?

4. When the points are opened what happens to the current?

How Voltage is Increased

1. In the first two readings you read about the ignition system, its three (3) main functions, its six (6) main parts and its two circuits. As you should know, one of the functions of an ignition system is to increase the voltage from 12 volts to approximately 20,000 volts in order to spark the engine.

2. The ignition system increases the voltage through the ignition coil. Voltage can either be increased or decreased. This is done through a transformer. To decrease voltage you use what is called a step-down transformer and to increase voltage you use a step-up transformer. The ignition coil is a step-up transformer. It raises the voltage from 12 volts to 20,000 volts.

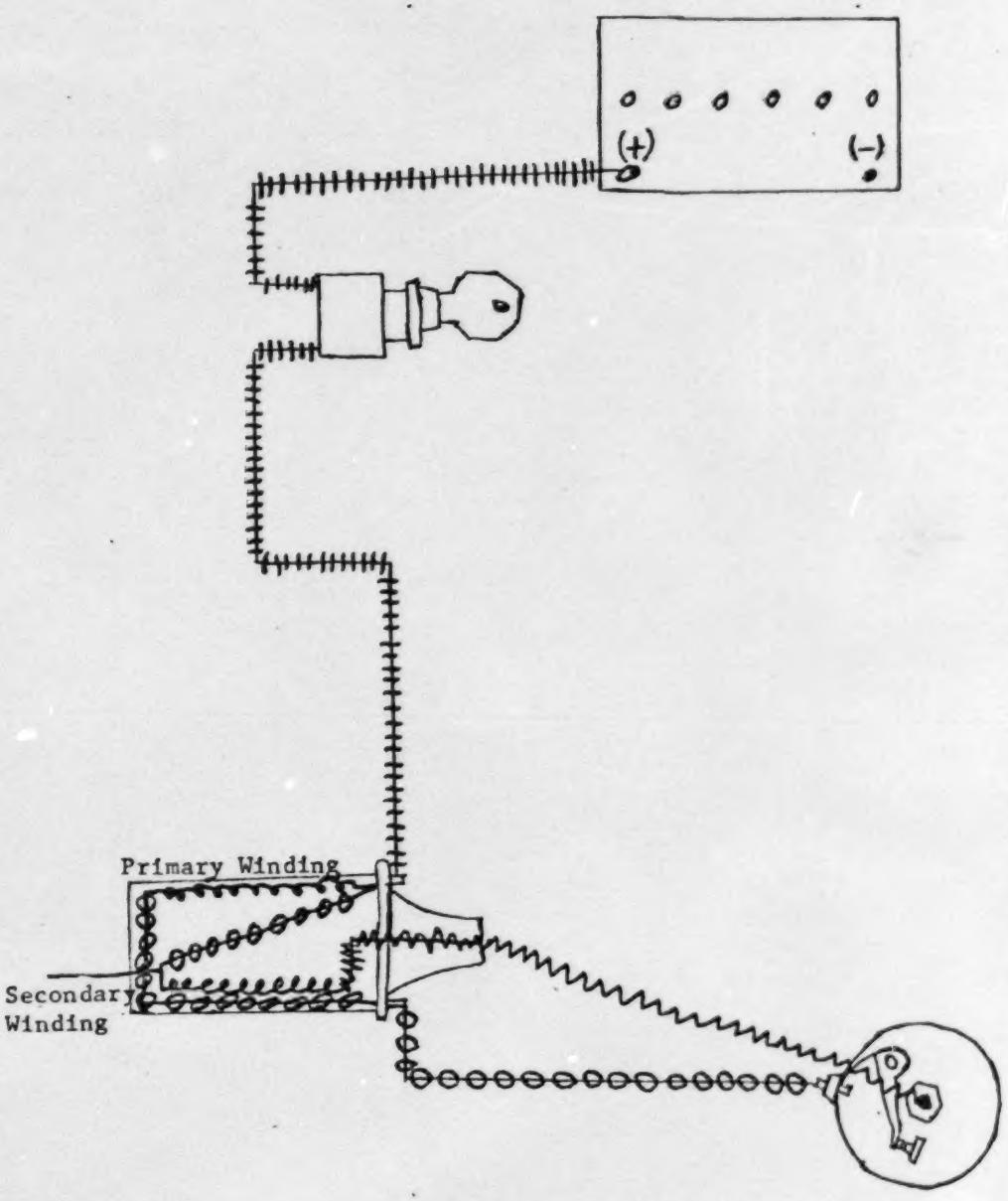
3. When the ignition switch is opened an electrical current is allowed to pass from the positive battery terminal into the primary winding in the ignition coil. As the electric current passes through the primary winding it is increased from 12 volts to 250 volts. This is a big increase but not enough to ignite the gases.

4. The increased current (250 volts) moves on to a set of contact points. The contact points allow the current (250 volts) to pass to a grounded section. When the points are closed the current (250 volts) flows through them and a buildup of primary voltage in the ignition coil is produced. When the points open, the current (250 volts) must find a new path. The new path is the secondary winding in the ignition coil. When there is a break in the flow of the primary current, the current is automatically sent into the secondary winding.

5. The secondary winding in the ignition coil has 2,000 turns. The current (250 volts) passes through the secondary winding and is increased to approximately 20,000 volts. The current (20,000 volts) then passes through the coil tower. A wire or cable then carries the current (20,000 volts) to the center of the ignition distributor cap.

6. The distributor cap is a meeting place for all the spark plug wires. After the current (20,000 volts) is delivered to the distributor cap the ignition distributor then passes the current (20,000 volts) to one of the cables which then takes it to the spark plug and then ignites the compressed gases.

7. Now you should know how the low voltage is increased from 12 volts to 20,000 volts. The following diagram will give you a simplified explanation of how the voltage is increased. The next information sheet will explain how the increased voltage is delivered to the proper cylinder.



12 Volt Current

250 Volt Current

20,000 Volt Current

Find The Answers

2.3

1. The ignition system increases the voltage through the

   A. Positive battery terminal
   B. Ignition coil
   C. Points

2. The word in paragraph 1 which means a group of units is _____.

3. The words "on to a set of points" in paragraph 4 refers to the _____

   _____.

4. The story does not say so, but it makes you think that

   A. The primary winding increases current from 10 volts to 200 volts.
   B. The step-up transformer is the ignition switch.
   C. The points are responsible for grounding the electric current.

5. The distributor cap is a meeting place for all the spark plug wires.

   Yes No Does not say

6. On the whole, this story is about

   A. The distributor cap.
   B. The way low voltage is increased from 12 volts to 20,000 volts.
   C. The secondary winding in the ignition coil.

7. What is the primary function of the points?

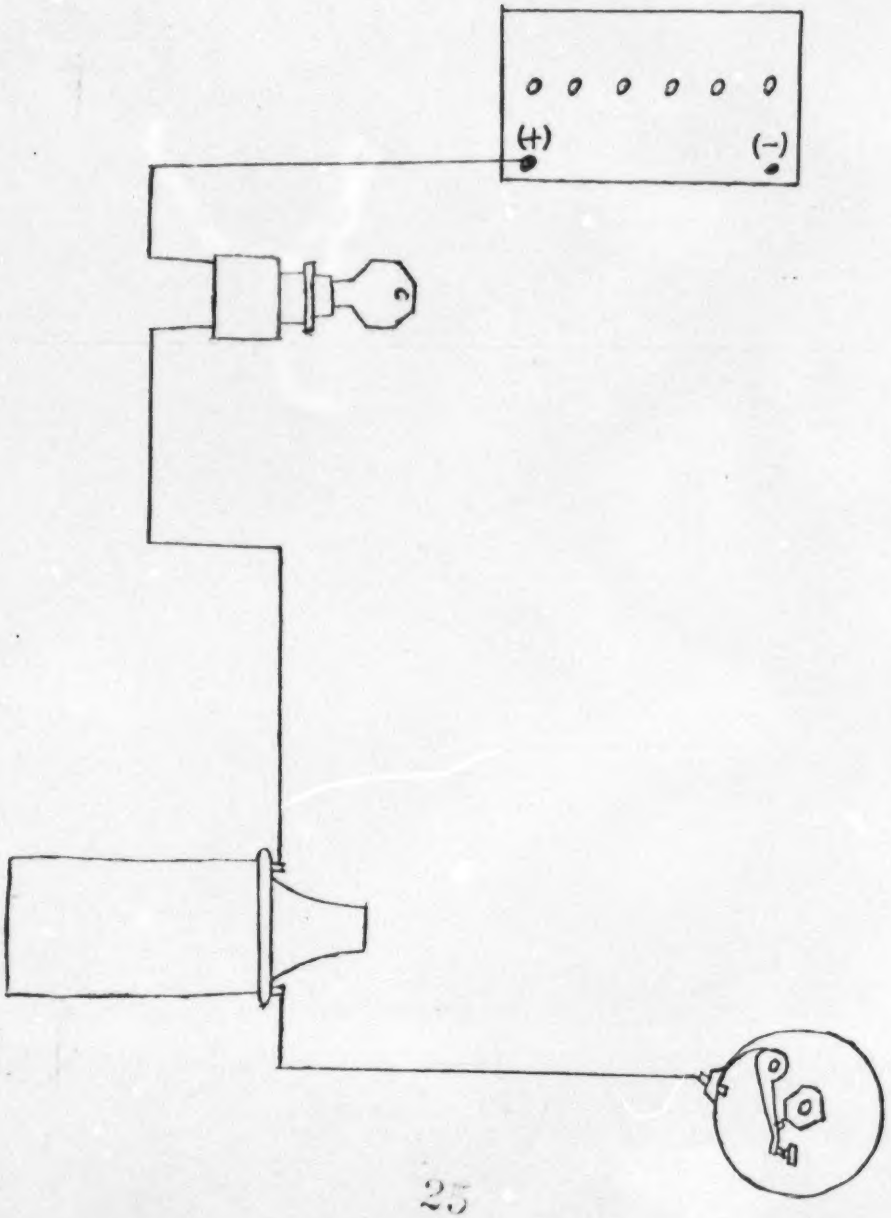
   A. To raise the voltage from 12 volts to 20,000 volts.
   B. To spark the engine.
   C. To allow the current to pass to a grounded section.

Use the following symbols to trace the three types of current on the following diagram:

12 volts ⊣|⊢|⊣|⊢|⊣|⊢|⊣|⊢|⊣|⊢|⊣|⊢

250 volts ⊣|⊢⊣|⊢⊣|⊢⊣|⊢⊣|⊢⊣|⊢⊣|⊢⊣|⊢

20,000 volts ∿∿∿∿∿∿



Unscramble the following words: 2.3

1. rfrtnasremo _____
2. gtaeovl _____
3. ilco _____
4. lartemin _____
5. dreyclni _____
6. tnrceru _____
7. psedmocser _____
8. thwisc _____
9. tdsiutirbro _____
10. ngiwdin _____

Match the following:

_____Primary winding	A. increases voltage
_____Secondary winding	B. increases the 250 volts to 20,000 volts
_____Step-down transformer	C. meeting place for all spark plug wires
_____Step-up transformer	D. increases voltage from 12 volts to 250 volts
_____Distributor cap	E. decreases voltage

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Mark the following statements True (T) or False (F):

1. _____One of the functions of the ignition system is to increase the voltage.
2. _____The voltage is increased by the battery.
3. _____A step-up transformer decreases voltage.
4. _____A step-down transformer increases voltage.
5. _____An open ignition switch allows the current to pass.
6. _____The primary winding in the coil increases the voltage from 12 volts to 20,000 volts.
7. _____The ignition coil is a step-up transformer.
8. _____There are 2,000 turns in the secondary winding of a coil.
9. _____A wire or cable carries the high voltage current from the tower of the coil to the center of the distributor cap.
10. _____The increased voltage ignites the compressed gases in the distributor.

Arrange the words below in alphabetical order. The first word is Circuit.

1. winding _____
2. compressed _____
3. circuit _____
4. distributor _____
5. cylinder _____
6. switch _____
7. current _____
8. step-up _____
9. terminal _____
10. coil _____
11. ignites _____
12. voltage _____

Instructions:

In this information sheet you will read about how the spark is delivered to the proper cylinder. The vocabulary list will help you with important words in the information sheet.

Instrucciones:

En esta página de información vas a leer como se transmite la chispa para el propio cilindro. El vocabulario te ayudará con palabras importantes en la página de información.

Vocabulary:

Camshaft - a rotating or sliding piece that imparts motion.

Rotates - to turn

Cam Assembly - an object found in the distributor that has lobes and is rotated by the camshaft.

Lobes - a curved or rounded object.

Rotor - a part that revolves on a stationary part.

Terminals - used for making electrical connections.

Keep the following questions in mind as you read the information sheet.

1. How is the cam assembly operated?

2. What is a lobe and how many does a cam assembly have?

3. How is the voltage passed from the center terminal of the distributor to the outside terminals?

Delivery of the Spark to the Proper Cylinder

1. As you may recall, there are three (3) functions in the ignition system. One of the functions is to deliver the spark to the proper spark plug at the proper time. This is done mainly by the distributor.

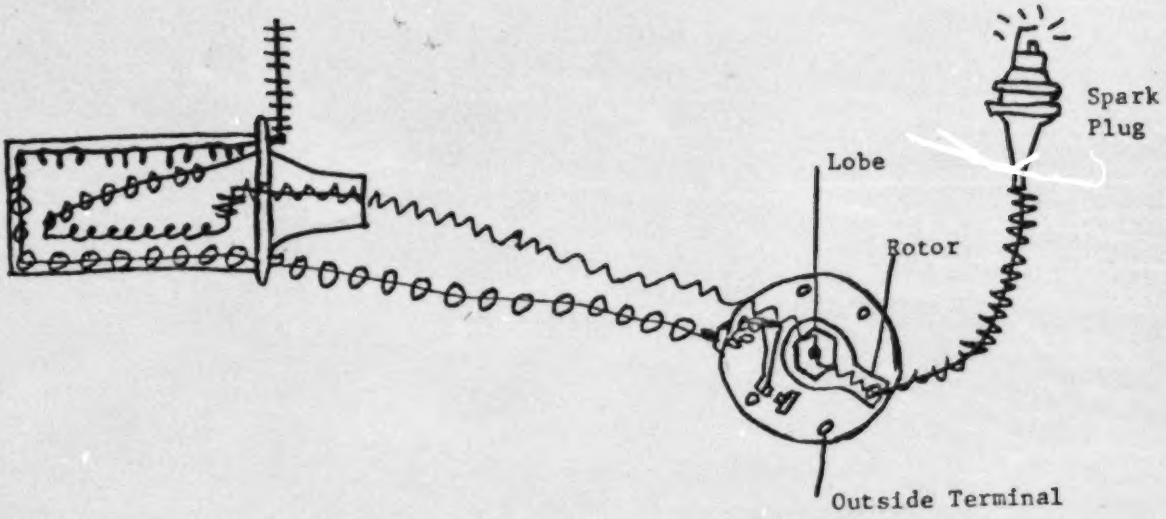
2. The distributor is operated by two gears that are driven directly or indirectly by the camshaft. As the camshaft turns, it rotates what is called the cam assembly. The cam assembly is located on the upper part of the distributor. The cam assembly has lobes on it. A lobe is a curved or rounded object. There is one lobe for every cylinder in the engine. The cam assembly is always touching the rubbing block of the points. When one of the lobes of the cam assembly is touching the rubbing block the points are open. When the flat surface of the cam assembly is touching the rubbing block the points are closed.

3. Do you remember what happens to the current when the points are open or closed? Let's review. When the points are closed the current (250 volts) flows to a grounded section. When the points are opened the current is sent through the secondary winding in the coil and increased to (20,000 volts) and then is carried from the center tower of the ignition coil to the center of the distributor cap.

4. Going back to the delivery of the spark to the proper spark plug, as the camshaft turns the cam assembly also rotates. When the increased voltage (20,000 volts) enters the center of the distributor it is received by the rotor. The rotor connects the center terminal of the distributor cap with the outside terminals of the distributor cap. The distributor has a carbon button that is always touching the rotor blade.

5. When the high-voltage surge enters the center of the distributor it is then carried by the rotor to one of the outside terminals. The high voltage surge is then carried to the proper spark plug where it ignites the compressed gases. The proper timing of the distributor is responsible for delivering the current (20,000 volts) at the right time and to the right cylinder.

6. By now you should have a basic understanding of the ignition system and its functions. The next information sheet will explain some of the problems that occur in the ignition system.



12 Volt Current

250 Volt Current

20,000 Volt Current

Find The Answers

1. The spark is delivered to the spark plug mainly by the

   A. Coil
   B. Battery
   C. Distributor
   D. Switch

2. The word in paragraph 2 that means run by or worked by is _____.

3. The words "curved or rounded" in paragraph 2 refer to _____.

4. The story does not say so, but it makes you think that

   A. The spark could not be delivered without the rotor.
   B. The spark is delivered by the coil to the spark plugs.
   C. There are two lobes for every cylinder.

5. The cam assembly is located on the camshaft.

   Yes No Does not say

6. On the whole, this story tells you how

   A. The rubbing block delivers the spark.
   B. The spark is made.
   C. The spark is delivered by the distributor.

7. Why is it important to study the ignition system?

   A. To be able to know how to increase voltage.
   B. To be able to repair faulty ignition systems.
   C. To be able to tell people what you know.

Fill in the blanks.

1. A lobe is a curved or _____object.

2. There is _____lobe for every cylinder in the engine.

3. The cam assembly is located on the upper part of the _____.

4. When the rubbing block of the points is touching a lobe the points are _____.

5. When the points are open the current is sent through the _____ winding in the coil.

6. When the current goes through the secondary winding in the coil it is increased to _____volts.

7. When the camsahft turns the cam assembly _____.

8. The rotor connects the outside _____of the distributor with the center terminals.

9. The distributor has a _____button that is always touching the rotor.

10. The distributor is responsible for delivering the current at the right time and the right _____.

Fill in the missing letters

t_rm_na_s	c_li_de_	co_l
l_be	c_m	ge_r
r_t_r	c_ms_af_	r_t_te
		v_lts

Answer the following questions:

1. How is the cam assembly operated?

2. What happens to the current when the points are open?

3. How does the rotor help to deliver the high voltage current?

4. Why is the rotor important?

5. How do the compressed gases become ignited?

Fill in the blanks from the words in the following list.

distributor	rotor
camshaft	secondary winding
lobe	cam assembly

1. Is operated by two gears. _____
2. Curved or rounded object. _____
3. Increases voltage from 250 volts to 20,000 volts. _____
4. Has one lobe for every cylinder in the engine. _____
5. It rotates the cam assembly. _____
6. Connects the center and outside terminals in the distributor. _____

Instructions:

In this information sheet you will read about the most common problems caused by a faulty ignition system and the troubleshooting steps taken to solve the problem. The vocabulary list will help you with important words in the information sheet.

Instrucciones:

En esta página de información vas a leer de los problemas que ocurren mas frequente en un sistema de ignición y de los medios que se usan para resolver el problema. El vocabulario te ayudará con palabras importantes en la página de información.

Vocabulary

Troubleshooting - problem solving

Sluggish - slow to respond

Voltmeter - an instrument for measuring volts

Starter circuit indicator - an instrument for measuring electric current.

Contact points - an object that allows current to be grounded or returned to the ignition coil.

Keep the following questions in mind as you read the information sheet.

1. What are the most common problems caused by a faulty ignition system?

2. Why must you always follow the troubleshooting steps?

3. What instruments are used for troubleshooting?

4. What causes the problems in the ignition system?

1. By now you have read about the ignition system and how it works. This sheet will explain some of the most common problems caused by faults in the ignition system. The following are seven (7) of the most common problems.

    1. Engine cranks but does not start.
    2. Engine is difficult to start.
    3. Engine misses at low speed.
    4. Engine misses at high speed.
    5. Engine is cross firing to wrong cylinder.
    6. Engine runs smooth but sluggish.
    7. Engine starts but will not continue to run.

2. The first step in troubleshooting is to check the battery. If the battery is weak then it does not deliver enough voltage. Sometimes the terminals and cables of the battery are dirty and should be cleaned. The next step would be to check the starter. Sometimes the starter does not allow the voltage to pass through properly. The starter can be tested with a voltmeter. The starter should not use more than 2 volts while cranking. A starter circuit indicator can also help test the starter. The current in the starter should not exceed 300 ampers.

3. The next step is to check the spark going to the spark plug. Remove the high tension wire from the spark plug and insert a cottor pin to the wire. While cranking, hold the cottor pin about ¼ inch from the engine block. If you see a sharp blue spark then your current is good but if the spark is weak and reddish then your ignition system is faulty.

4. You must now make a visual inspection of all wires to see if any are loose, broken or out of place. If this does not solve your problem when using the voltmeter, check for:

1. Open circuit in the primary.
2. Shorted circuit in the primary.
3. Poor or broken connections in the secondary circuit.

5. After checking these, your next step is to check the condition of the contact points, spark plugs or the high tension wires going to the spark plugs.

6. If these tests do not solve your problem then the secondary circuit may be your problem. Check your secondary circuit for any of the following:

1. Wet, damaged or worn out distributor cap.
2. Faulty rotor.
3. Improper ignition timing.

7. As you must know by now, to be a good auto mechanic you must follow the troubleshooting steps carefully. If you skip any, you may have to repeat the process all over again, costing you and your customers time and money.

Find The Answers

1. What is the first thing you should check in troubleshooting?

   A. Voltmeter
   B. Battery
   C. Starter circuit

2. The word in paragraph 4 which means relating to vision is _____.

3. The words "should not exceed 300 ampers" in paragraph 2 refer to_____

4. The story does not say so, but it makes you think that

   A. The battery is not important in trouble shooting.
   B. The secondary circuit is the first place to check in trouble shooting.
   C. Trouble shooting in the ignition usually starts with the battery.

5. A sharp blue spark indicates a good current.

   Yes No Does not say

6. On the whole this story is about

   A. The secondary circuit.
   B. An open circuit in the primary circuit.
   C. Common problems related to the ignition system.

7. What are the colors of the spark in the spark plugs?

   A. Orange and green
   B. Blue and red
   C. Yellow and white

Look at the words below. If the word is spelled correctly circle the R. If the word is mispelled circle the W and spell the word correctly in the blank.

R	W	kranks	_____
R	W	cylinder	_____
R	W	circut	_____
R	W	voltage	_____
R	W	slugish	_____
R	W	tencion	_____
R	W	distributor	_____
R	W	roter	_____
R	W	repete	_____
R	W	valtmeter	_____

Circle the correct word in parenthesis.

1. (There, Their) are seven common problems in an ignition system.
2. The first step in trouble shooting (an, a) ignition system is to check the battery.
3. The starter (should, should not) use more than 2 volts.
4. If (this, these) does not solve your problems go to the next step.
5. The voltmeter is used (to, too) check the volts.
6. If the battery is (week, weak) then it does not deliver enough voltage.

Answer the following questions:

1. There are seven common problems in the ignition system. Name at least four of these problems.

   A.

   B.

   C.

   D.

2. What is the first step in troubleshooting?

3. How many volts does a starter use while cranking?

4. When using a starter circuit indicator the ampers should not exceed_____.

5. How do you check the spark going to the spark plugs?

6. After preparing the high tension wire to check the spark, what colors are the sparks and what does each one indicate?

7. When you make a visual inspection of all wires, what are you looking for?

8. If your visual inspection does not solve your problems, what three things do you check with the voltmeter.

9. If the voltmeter test does not solve your problems, what three things do you check for in the secondary system?

10. What will happen if you do not follow your troubleshooting steps?

POST TEST FOR IGNITION SYSTEMS

1. What are the six main parts of an ignition system?

2. What are the three main functions of an ignition system?

3. What is the purpose of the ignition distributor?

4. What is the primary circuit composed of?

5. How does the ignition system increase the voltage?

6. What does the secondary winding do?

7. How is the cam assembly operated?

8. How does the rotor deliver the high voltage current?

9. What is the first step in troubleshooting an ignition system?

10. What are the two colors of the spark and what does each mean?

Vocabulary	Vocabulario
aware	saber
approximately	aproximadamente
allowed	permitir
ampers	amperios
battery cell	célula de batería
camshaft	árbol de levas
compress	comprimir
coil	bobina
current	corriente
contact points	platinos
coil tower	tapa de bobina
cables	cables
customers	marchantes
device	aparato
diagram	dibujo
distribute	distribuir
deliver	transmitir
difficult	difícil
electrode	electrodo
exceed	exceder
fault	falta
gap	luz ,boquete
grounded	conectado a tierra
gear	engranaje
high speed	alta velocidad
ignition	ignición
ignite	encender

Vocabulary	Vocabulario
insulator	aislador
low speed	baja velocidad
misses	fallas
mixture	mezcla
spark plugs	bujías
purpose	propósito
primary	primario
path	recorrido
positive	positivo
problem	problema
rotor	rotor
repeat	repetir
solve	resolver
skip	omitir
starter	motor de arranque
secondary	secundario
set	par
switch	interruptor
specific	específico
spark	chispa
system	sistema
strokes	carrera
transformer	transformador
terminal	terminal
timing	regulación
understanding	entendimiento

Vocabulary	Vocabulario
unit	unidad
voltage	voltaje
volts	voltios
weak	débil
winding	arrollamiento